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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Gennady Anatollevich Gienko

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EXAMINER

PATEL, JAYESH A

ART UNIT

PAPER NUMBER

2624

NOTIFICATION DATE

DELIVERY MODE

05/17/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/599,969	<b>Applicant(s)</b> GIENKO ET AL.	
	<b>Examiner</b> JAYESH A. PATEL	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-46 and 48-52 is/are rejected.
- 7) ☒ Claim(s) 47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/16/2006</u>  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitations of “an additional right video camera, an additional left video camera and an additional monitor” as claimed in claims 49-50 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 recites the limitation "the aiming vectors of the eyes" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the observed model" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 48 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 48 depends from claim 47 which recites said second specially marks and claim 47 depends from claim 45 which recites said first specially marks. Therefore the recital of said special shape in claim 48 renders the claim indefinite as to which of the first or second special marks is ellipsoidal.

***Claim Objections***

Claim 46 is objected to because of the following informalities: Claim 46 recite "said special shape" at line 1. It should read "said first special shape.

Appropriate correction is required.

Claim 20 or 21 recited at claims 22,23,29,31 and 33 should read “claims 20 or 21”. Appropriate correction is required.

Claim 39 is objected to because of the following informalities: Claim 39 recite “said head movement” at line 1. It should read “said head movements”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Kenichi et al. (EP 0817123 A1) hereafter Kenichi as best understood by the examiner.

1. Regarding claim 20, Kenichi discloses a method of measuring stereoscopic image points comprising the steps of:

a. construction of a stereoscopic model of an object using a pair of overlapping images (**page 2 lines 40-49 which discloses a stereoscopic model displayed (constructed) using the pair of images**);

b. determination of the aiming vectors of the eyes during stereoscopic perception of that model **(page 12 lines 49 through page 13 lines 38 and Figs 13a-13b which discloses the aiming vectors (lines) for the both the eyes looking at the model);**

c. recording aiming vector data at the moment of eye fixation **(page 2 lines 42-44 which disclose fixing the eyes with respect to the model)**, by computing a projection of the area of fixation of the observed model on a monitor screen, for each eye **(Page 4 lines 44-57, page 15 lines 3-6 discloses gaze area determined with respect to model displayed);** and

d. calculating a typical point of the object being observed **(page 4 line 10 which discloses the gaze point estimated by the computer of the observed model).**

2. Regarding claim 21, Kenichi discloses the method as claimed in claim 20 in which said typical point is identified for the left and right eye by time synchronization **(page 6 lines 53-55 which discloses synchronization and page 2 lines 12-15 discloses the typical point with respect to left and right eyes).**

3. Regarding claim 22, Kenichi discloses the method as claimed in claim 20 or 21 in which said typical point is calculated using a vectors coplanarity equation

**(Page 6 lines 1-45 where the equation of the gaze point is determined).**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 43-44 are rejected under 35 U.S.C. 102(e) as being anticipated by

Cheatle et al. (US 7365793) hereafter Cheatle.

**4.** Regarding claim 43, Cheatle discloses a device **(Figs 1a,1b and 2)** for the stereoscopic measuring of the position data of image points comprising:

a. a left video-camera for tracking movements of an observer's left eye

**(Figs 1a and 2 element 20 which captures images of the left side eye, Col 6 lines 42-67);**

b. a right video-camera for tracking movements of said observer's right eye **(Figs 1a and 2 element 18 which captures images of the right side eye, Col 6 lines 42-67);**

c. a video-camera for tracking said observer's head movements (**Figs 1a and 2 element 16 which captures images of the right side eye, Col 7 lines 7-10**);

d. a video-capture system for allowing capturing of an image by a personal computer (**Col 8 lines 53 through Col 9 line 8 which discloses processor generating an image of the scene based on the left, right and center (head) cameras**);

e. a monitor for displaying said image (**abstract discloses an image viewed by a person meets the limitations of the display of the processed image**); and

f. a stereo-observation system for allowing said observer to observe stereoscopic images (**Col 8 lines 53 through Col 9 line 8 which discloses processor generating an image of the scene based on the left, right and center (head) cameras and Col 6 lines 50-51 discloses a composite image (stereo) observed by the person wearing the spectacles**)).

**5.** Regarding claim 44, Cheatle discloses the device as claimed in claim 43 in which said stereo observation system includes a construction made in a shape of eyeglasses (**fig 1a discloses spectacles**).



***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 23-26 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenichi in view of Stuttler (US 6580448) hereafter Stuttler.

6. Regarding claim 23, Kenichi discloses the method as claimed in claim 20 or 21. Kenichi is however silent and do not recite in exact claim language further comprising the step of calibrating said method before starting observations by: a. observing of test-objects, with known position data in a main monitor; b. comparing positions of the centers of the pupils of the eyes with a camera; and c. calculating the mathematic dependencies, describing mutual transformations of said position data.

Stuttler discloses calibrating (**adjusting the eyes to two known points of fixation Col 3 lines 66 through Col 4 lines 5**) said method before starting observations by: a. observing of test-objects, with known position data in a main monitor (**two eyes coinciding with the images of both eyes with the help of fiduciary points meets the limitations of test objects at Col 4 lines 20-23**); b. comparing positions of the centers of the pupils of the eyes with a camera (**Col 4 lines 1-23 discloses the pupil distances between the eyes and orienting**

**them**); and c. calculating the mathematic dependencies, describing mutual transformations of said position data **(the eyes are directed parallel (mathematical) and the fiduciary points are coincided with the images of the eyes at Col 4 lines 20-23)**. Stuttler and Kenichi are combinable because they are from the same field of endeavor and are analogous art of eye fixation processing. The suggestion/motivation would be a better perceived image (eye motion corrected) than the actual image captured by the camera at **Col 4 lines 16-31**. Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of Stuttler in the method of Kenichi to obtain the claimed invention.

7. Regarding claim 24 see the explanation of claim 23.

8. Regarding claim 25, Kenichi and Stuttler discloses the method as claimed in claim 23. Stuttler discloses further comprising the step of presenting said test objects for observation with a condition selected from the group consisting of time, duration, order of appearance, location, size, **shape**, color, background, static appearance and dynamic appearance **(Col 3 lines 58-60 discloses the shape of the test objects (eyes) meeting the claim limitations)**.

9. Regarding claim 26 see the explanation of claim 25.

**10.** Regarding claim 41, Kenichi discloses the method as claimed in claims 20 or 21. Kenichi is however silent and do not recite in exact claim language further comprising the step of determining the position of the pupil of each eye during eye movement in three-dimensional space by receiving two images of each eye from two synchronized video-cameras, fixed on opposite sides of a head.

Stuttler discloses further comprising the step of determining the position of the pupil of each eye during eye movement (**Col 10 lines 11-26**) in three-dimensional space (**Col 6 lines 54-57 which discloses three dimension space**) by receiving two images of each eye from two synchronized video-cameras, fixed on opposite sides of a head (**Fig 1 shows the cameras fixed on the opposite sides of the head**). Stuttler and Kenichi are combinable because they are from the same field of endeavor and are analogous art of image processing (tracking eye and head movements based on images). The suggestion/motivation would be a better perceived image (eye motion corrected) than the actual image captured by the camera at **Col 4 lines 16-31**. Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of Stutter in the method of Kenichi to obtain the claimed invention.

**11.** Regarding claim 42 see the explanation of claim 41.

Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenichi in view of Zhang et al. (US 20030076980) hereafter Zhang.

**12.** Regarding claim 27, Kenichi discloses the method as claimed in claims 20 or 21. Kenichi is silent and however do not recite in exact claim language further comprising the step of visually controlling of measuring on said monitor screen by imprinting color markers into an area of image, corresponding to said fixations.

Zhang discloses the color coded markers used in the eyeglasses (HMD) for tracking and calibration at **paras 0029, 0034 and 0064** meeting the claim limitations of imprinting markers corresponding to fixations of the eyes. Zhang and Kenichi are combinable because they are from the same field of endeavor and are analogous art of image processing (head mounted displays). The suggestion/motivation would be the marker based robust system for tracking and calibration at **para 0008**. Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of marker based robust system of tracking and calibration into the system and method of Kenichi to obtain the claimed invention.

**13.** Regarding claim 28 see the explanation of claim 27.

**14.** Regarding claim 29, Kenichi discloses the method as claimed in claim 20 or 21. Kenichi is silent and however do not recite in exact claim language further

comprising the step of visually controlling of measuring on said monitor screen by modifying the color parameters of the area of the observed image corresponding to said fixations.

Zhang discloses modifying the color coded markers at **paras 0034, 0037 and 0041-0042** where the elimination of the square blocks in the color markers meets the limitations of modifying the color coded markers.

**15.** Regarding claim 30 see the explanation of claim 29.

Claims 31- 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenichi in view of Trajkovic et al. (US 20030063777) hereafter Trajkovic.

**16.** Regarding claim 31, Kenichi discloses the method as claimed in claim 20 or 21. Kenichi is silent and however do not recite in exact claim language further comprising the step of compensating for an observer's head movements by comparing motion of the aiming vectors of both eyes with observations of movements of said observer's head.

Trajkovic discloses the compensation of the head motion based on the facial features (eyes) vectors at **para 0010** based on the images. Trajkovic and Kenichi are combinable because they are from the same field of endeavor and analogous art of image processing. The suggestion/motivation would be computationally efficient algorithm for head and eyes tracking at **paras 0005-**

**0006.** Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of Trajkovic in the method of Kenichi to obtain the claimed invention.

**17.** Regarding claim 32 see the explanation of claim 31.

**18.** Regarding claim 33, Kenichi discloses the method as claimed in claim 20 or 21. Kenichi is silent and however do not recite in exact claim language further comprising the step of compensating for an observer's head movements by tracking movements of several marks fixed on said observer's head.

Trajkovic discloses the tracking the markers (points) on the head for the compensation of the head motion at **paras 0023-0025 and 0039.**

**19.** Regarding claim 34 see the explanation of claim 33.

**20.** Regarding claim 35, Kenichi discloses the method as claimed in claims 20 or 21. Kenichi is silent and do not recite in exact claim language further comprising the steps of: a. tracking an observer's head movements by marks fixed close to said observer's eyes and b. capturing images of said marks by video-cameras tracking said observer's eyes movements.

Trajkovic discloses the head motion based on the marks and the camera images at **paras 0021-0022** meeting the claim limitations.

**21.** Regarding claim 36 see the explanation of claim 35.

**22.** Regarding claim 37, Kenichi and Trajkovic discloses the method as claimed in claim 35. Trajkovic discloses further in which said marks are specially shaped **(Fig 2 where the marker points are dots and elliptical).**

**23.** Regarding claim 38 see the explanation of claim 37.

**24.** Regarding claim 39, Kenichi and Trajkovic discloses the method as claimed in claim 35. Trajkovic discloses in which said head movements are tracked in two different planes **(paras 0039 and 0040 discloses the head movements based on the tilt and rotation meeting the limitations of two planes).**

**25.** Regarding claim 40 see the explanation of claim 39.

Claims 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheatle in view of Kasahara (US 5070883) hereafter Kasahara.

**26.** Regarding claim 45, Cheatle discloses the device as claimed in claim 44 which includes eyeglasses. Cheatle is silent and however do not recite in exact claim language in which said eyeglasses include first specially shaped marks

located in the vertical plane so that images of said first specially shaped marks are captured by said left and right video cameras.

Kesahara shows the specially shaped marks captured by the left and the right cameras in Figs 1 and 3. Kesahara and Cheatle are combinable because they are from the same field of endeavor and are analogous art of image processing (eye tracking based on images captured by cameras). The suggestion/motivation would be a precise detection of the eye movement at **col 2 lines 20-22**. Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of precise eye tracking in the device of Cheatle to obtain the claimed invention.

**27.** Regarding claim 46, Cheatle and Kesahara discloses the device as claimed in claim 45. Kesahara discloses in which said special shape is ellipsoidal (**Fig 3 shows the ellipsoidal shape of the eye**).

Claims 49 -52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheatle in view of Spero (US 20030169213) hereafter Spero.

**28.** Regarding claim 49, Cheatle discloses plural cameras as seen in claim 43. Cheatle is silent and however do not recite in exact claim language the device comprising an additional video cameras to track the movement of left and right eyes.



Spero discloses one to seven cameras for tracking eyes and head movements at **(para 0132)** meeting the limitations of using additional cameras for tracking the left and right eyes as claimed. Cheatle and Spero are combinable because they are from the same field of endeavor and are analogous art of image processing (tracking eyes based on images captured by the cameras). The suggestion/motivation would be a highly reliable, simple and lower cost system of tracking eyes in the HUD's at **(paras 0013 and 0014)**. Therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to have recognized the advantages of Spero in the device of Cheatle to obtain the claimed invention.

**29.** Regarding claim 50 see the explanation of claims 43 and 49. Spero discloses multiple display screen at **para 0132** meeting the claim limitations.

**30.** Regarding claim 51, Cheatle and Spero discloses the device as claimed in claim 49. Spero discloses further comprising a system for infrared highlighting of said observer's eyes **(para 0053 discloses illuminating the eyes with the infrared LED's meeting the claim limitations)**.

**31.** Regarding claim 52, Cheatle discloses the device as claimed in claim 43. Cheatle discloses optical sensor deriving image segments (which is technically

light), however is silent and do not recite in exact claim language further comprising infrared color filters in front of said right and left video cameras.

Spero discloses in **paras 0131 and 0132** a color camera system seeing different wavelengths of radiation (infrared) meeting the claim limitations.

### ***Allowable Subject Matter***

Claim 47 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Other Cited Prior art***

The other cited prior art pertinent to applicant's disclosure but not relied on are (US 5359362), (US (US 20050207486), (US 7533989), (US 6003991), (US 20030086061), (JP 2000-214408A), (US 5555895), (WO 99/27412), (US 20040210159), (US 20060098087), (US 5365370), (US 6568809), (US 5349379) and (US 6011581).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on 5-4-9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

05/11/2011  
/JAYESH A PATEL/  
Examiner, Art Unit 2624